

## TENT COOPERATION TRE Y

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing: 24 February 2000 (24.02.00)	
International application No.: PCT/GB99/02492	Applicant's or agent's file reference: A25636 WO
International filing date: 30 July 1999 (30.07.99)	Priority date: 14 August 1998 (14.08.98)
Applicant: PETTIFOR, James, Douglas et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International preliminary Examining Authority on:  
22 November 1999 (22.11.99)☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was  
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer:  J. Zahra Telephone No.: (41-22) 338.83.38
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## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>A25636 W0</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 99/ 02492</b>	International filing date (day/month/year) <b>30/07/1999</b>	(Earliest) Priority Date (day/month/year) <b>14/08/1998</b>
Applicant <b>BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

## 4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

## 5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

## 6. The figure of the drawings to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

3



None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 99/02492

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 H04Q3/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 48238 A (NORTHERN TELECOM INC) 18 December 1997 (1997-12-18) page 2, line 18 -page 3, line 26 page 60, line 3 -page 61, line 8	1-5,8
X	EBERT I ET AL: "APPLICATION OF A SERVICE-INDEPENDENT ARCHITECTURE" INNOVATIONS IN SWITCHING TECHNOLOGY, STOCKHOLM, MAY 28 - JUNE 1, 1990, vol. 6, no. SYMP. 13, 28 May 1990 (1990-05-28), pages 57-62, XP000130898 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS page 59, column 2, line 25 - line 38 figure 5	1-5,8

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance  
 "E" earlier document but published on or after the international filing date  
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  
 "O" document referring to an oral disclosure, use, exhibition or other means  
 "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone  
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art  
 "&" document member of the same patent family

Date of the actual completion of the international search

2 November 1999

Date of mailing of the international search report

10/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
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Authorized officer

Chassatte, R

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 99/02492

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BOSCO P G ET AL: "A LABORATORY FOR AIN SERVICE DESIGN AND VALIDATION" DISCOVERING A NEW WORLD OF COMMUNICATIONS, CHICAGO, JUNE 14 - 18, 1992, vol. 2, 14 June 1992 (1992-06-14), pages 566-571, XP000326745 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS page 570, column 1, paragraph 4.1 -page 571, column 1, paragraph 5	1-5,8
X	WO 96 13949 A (NOKIA TELECOMMUNICATIONS OY ;HUOTARI SEPPÖ (FI); TURKULAINEN VELI) 9 May 1996 (1996-05-09) page 3, line 28 -page 7, line 13 page 11, line 23 -page 13, line 14	1-5,8
X	US 5 701 412 A (TAKEDA YUKIKO ET AL) 23 December 1997 (1997-12-23) the whole document	1-5,8

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02492

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9748238	A	18-12-1997	AU 3391597 A	07-01-1998
			AU 3487097 A	07-01-1998
			AU 3487597 A	07-01-1998
			EP 0906704 A	07-04-1999
			EP 0904661 A	31-03-1999
			EP 0906705 A	07-04-1999
			WO 9748239 A	18-12-1997
			WO 9748240 A	18-12-1997
WO 9613949	A	09-05-1996	FI 945151 A	02-05-1996
			AU 701814 B	04-02-1999
			AU 3748795 A	23-05-1996
			CA 2203798 A	09-05-1996
			CN 1166908 A	03-12-1997
			EP 0789977 A	20-08-1997
			JP 10512721 T	02-12-1998
			NO 972027 A	30-06-1997
US 5701412	A	23-12-1997	JP 7226797 A	22-08-1995

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REC'D 12 SEP 2000

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference A25636 WO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/02492	International filing date (day/month/year) 30/07/1999	Priority date (day/month/year) 14/08/1998
International Patent Classification (IPC) or national classification and IPC H04Q3/00		
Applicant BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  22/11/1999	Date of completion of this report  06.09.2000
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Hodgins, W  Telephone No. +49 89 2399 8987  

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/02492

## I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

### Description, pages:

1,3-6	as originally filed		
2	as received on	24/08/2000	with letter of 22/08/2000

### Claims, No.:

9-11	as originally filed		
1-8	as received on	24/08/2000	with letter of 22/08/2000

### Drawings, sheets:

1/3-3/3	as originally filed
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2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/02492

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes:	Claims	1-11
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-11
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-11
	No:	Claims	

### 2. Citations and explanations

**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

**see separate sheet**



**Concerning Point V**

The following documents are cited:

- D1: WO 97 48238 A (NORTHERN TELECOM INC) 18 December 1997 (1997-12-18)
- D2: EBERT I ET AL: 'APPLICATION OF A SERVICE-INDEPENDENT ARCHITECTURE' INNOVATIONS IN SWITCHING TECHNOLOGY, STOCKHOLM, MAY 28 - JUNE 1, 1990, vol. 6, no. SYMP. 13, 28 May 1990 (1990-05-28), pages 57-62, XP000130898 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
- D3: BOSCO P G ET AL: 'A LABORATORY FOR AIN SERVICE DESIGN AND VALIDATION' DISCOVERING A NEW WORLD OF COMMUNICATIONS, CHICAGO, JUNE 14 - 18, 1992, vol. 2, 14 June 1992 (1992-06-14), pages 566-571, XP000326745 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
- D4: WO 96 13949 A (NOKIA TELECOMMUNICATIONS OY ;HUOTARI SEPPO (FI); TURKULAINEN VELI) 9 May 1996 (1996-05-09)
- D5: US-A-5 701 412 (TAKEDA YUKIKO ET AL) 23 December 1997 (1997-12-23)

- 2) Independent claim 1 relates to a telephone network comprising a telephone switching centre coupled to a subscriber line and an enhanced service processing apparatus. This is, of course, generally known in the art. More particularly, claim 1 relates to an Intelligent Network (IN) network. These are generally known in the art, for example from D1 - D5, which are all of similar relevance, D1 and D4 being cited in the description.

A problem with these known INs (see introductory part of the description) is that enhanced processing is invoked if the switching centre identifies the call as being of a type that may require enhanced processing (a trigger point is detected; in the wording of the claim if a "predetermined event associated with the subscriber line" has been detected by "event detector means" which is for "recording the occurrence" of the event). This results in lots of traffic between the switching centres and the enhanced service processing apparatus, which, if some conditions are not met, may be unnecessary. The current application ameliorates

this problem.

In particular (cf features of claim 1), in the current application, a selection of processing to be carried out is made according to whether an occurrence of the above predetermined event associated with the subscriber line has been recorded by detection means. This "occurrence of a predetermined event" is shown and discussed with respect to figure 3 of the current application (set flag after either an event or a notification) and overcomes the problem identified by the applicant in the introductory part of the current application. This means that previous events associated with a line determine if enhanced processing is to be invoked. This may save signalling in particular if the processing is not to be invoked.

This is neither known nor derivable from the prior art or its combinations. Claim 1 thus meets the requirements of Articles 33(1) - (4) PCT with regard to novelty, inventive step and industrial applicability.

- 3) Similar comments to the above apply to corresponding independent method claim 8. Claim 8 thus meets the requirements of Articles 33(1) - (4) PCT with regard to novelty, inventive step and industrial applicability.

Owing to their dependencies on claims 1 or 8, claims 2 - 7 and 9 - 11 also meet the requirements of Articles 33(1) - (4) PCT with regard to novelty, inventive step and industrial applicability.

### **Concerning Point VII**

- 1) The independent claims should have been put in the two part form recommended by Rule 6.3(b) PCT with a pre-characterising part reflecting the teachings of the closest prior art (eg D1 or D4).
- 2) In order to meet the requirements of Rule 6.2(b) PCT, reference signs in parenthesis should have been added to the claims. This applies both to the preamble and to the characterising part, and to method claims in as far as they refer to apparatus features.

as normal" commands, for example, if the conditions for call forwarding are not met (line not busy, wrong time of day, etc). This extra traffic, and the extra processing carried out by the enhanced service processing apparatus, can impede the efficient operation of the enhanced services processes. It is an aim of the present invention to  
5 solve or ameliorate the aforementioned problem.

According to the present invention, there is provided a telephone network comprising a telephone switching centre coupled to a subscriber line, and an enhanced service processing apparatus,

the switching centre having event detection means for recording the  
10 occurrence of a predetermined event associated with the subscriber line, and call processing means responsive to an attempt to establish or terminate a call connection via the subscriber line to selectively either:

notify the enhanced service processing apparatus of that attempt, or:

establish or terminate said call connection without such notification;

15 according to whether occurrence of the predetermined event has been recorded by the detection means, the enhanced service processing apparatus having means responsive to such notification to send switching control commands to the telephone switching centre. As a consequence, traffic between the switching centre and the enhanced services processing apparatus only occurs when there is at least the  
20 possibility of a switching control command other than "proceed as normal".

Preferably, the switching centre includes processing means including flag means, the processing means being responsive to notification of said predetermined event to change the state of said flag means and, in the event of an attempt to establish or terminate a call connection via said subscriber line, to determine, in  
25 dependence on the state of the flag means, whether to notify the enhanced service processing apparatus of the attempt. The switching centre therefore merely requires a flag to be set for each subscriber line to indicate whether the switch should currently invoke the enhanced services processing apparatus. The flags are controlled by the service processing apparatus, in response to requests from the user, or other events.  
30 The switch itself carries out no processing of the enhanced service, other than to determine from the flag setting whether the enhanced services processing apparatus is required.

Preferably, event-detecting means is included for detecting a predetermined event and notifying the switching centre of an occurrence of said event.

Claims

1. A telephone network comprising a telephone switching centre coupled to a subscriber line, and an enhanced service processing apparatus,
- 5 the switching centre having event detection means for recording the occurrence of a predetermined event associated with the subscriber line, and call processing means responsive to an attempt to establish or terminate a call connection via the subscriber line to selectively either:
- 10 notify the enhanced service processing apparatus of that attempt, or:  
establish or terminate said call connection without such notification;  
according to whether occurrence of the predetermined event has been recorded by the detection means, the enhanced service processing apparatus having means responsive to such notification to send switching control commands to the telephone switching centre.
- 15
2. A network according to claim 1, wherein the switching centre includes processing means including flag means, the processing means having means responsive to notification of said predetermined event to change the state of said flag means and, having means to determine, in dependence on the state of the flag means,
- 20 whether to notify the enhanced service processing apparatus of an attempt to establish or terminate a call connection via said subscriber line.
3. A network according to claim 1 or 2, including event detecting means for detecting a predetermined event and notifying the switching centre of an occurrence
- 25 of said event.
4. A network according to claim 2, wherein the processing means includes a plurality of flag means associated with respective predetermined events, the processing means having means to change the state of the associated flag means in
- 30 response to notification of one of said predetermined events and selection means controlled in dependence on the states of the flag means, together with the flag means state information, the selection means being arranged to select whether to notify the enhanced service processing apparatus of an attempt to establish or terminate a call connection via said subscriber line, and to perform such notification if
- 35 so selected.

5. A network according to claim 4, wherein the enhanced service processing apparatus has means to control the switching centre in dependence on said flag state information.

5

6. A network according to claim 3, 4 or 5, wherein the event detecting means comprises a voice mail system, the event or one of the events comprises storing of voice mail for the subscriber of said subscriber line.

10 7. A network according to any one of claims 3 to 6, wherein the event detecting means comprises a call charging system and the event or one of the events comprises the call charge for the subscriber of said subscriber line exceeding a threshold value.

15 8 A method of processing calls in a telephone network comprising:-  
recording the occurrences of one or more predetermined events at a telephone switching centre, said events being associated with a subscriber line connected to the switching centre;

detecting attempts to establish or terminate calls via the subscriber line;

20 determining whether a record of the occurrence of one or more of said predetermined events exists at the switching centre; and

if it is determined that a record of the occurrence of one or more of said predetermined events exists at the switching centre:-

notifying an enhanced service processing apparatus of the attempt;

25 generating switching control commands at the enhanced service processing apparatus; and

communicating said commands to the switching centre to control the establishment or termination of said call; but

if it is determined that no record of the occurrence of one or more of  
30 said predetermined events currently exists at the switching centre:-

establishing or terminating the call using only the switching functions of the switching centre.

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JC07 Rec'd PCT/PTO 16 JAN 2001

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as normal" commands, for example, if the conditions for call forwarding are not met (line not busy, wrong time of day, etc). This extra traffic, and the extra processing carried out by the enhanced service processing apparatus, can impede the efficient operation of the enhanced services processes. It is an aim of the present invention to

5 solve or ameliorate the aforementioned problem.

Ins A3

According to the present invention, there is provided a telephone network comprising a telephone switching centre coupled to a subscriber line, and an enhanced service processing apparatus,

the switching centre having event detection means for recording the

10 occurrence of a predetermined event associated with the subscriber line, and call processing means responsive to an attempt to establish or terminate a call connection via the subscriber line to selectively either:

notify the enhanced service processing apparatus of that attempt, or:  
establish or terminate said call connection without such notification;

15 according to whether occurrence of the predetermined event has been recorded by the detection means, the enhanced service processing apparatus having means responsive to such notification to send switching control commands to the telephone switching centre. As a consequence, traffic between the switching centre and the enhanced services processing apparatus only occurs when there is at least the

20 possibility of a switching control command other than "proceed as normal".

Preferably, the switching centre includes processing means including flag means, the processing means being responsive to notification of said predetermined event to change the state of said flag means and, in the event of an attempt to establish or terminate a call connection via said subscriber line, to determine, in

25 dependence on the state of the flag means, whether to notify the enhanced service processing apparatus of the attempt. The switching centre therefore merely requires a flag to be set for each subscriber line to indicate whether the switch should currently invoke the enhanced services processing apparatus. The flags are controlled by the service processing apparatus, in response to requests from the user, or other events.

30 The switch itself carries out no processing of the enhanced service, other than to determine from the flag setting whether the enhanced services processing apparatus is required.

Preferably, event-detecting means is included for detecting a predetermined event and notifying the switching centre of an occurrence of said event.

Ins A4

Claims

see col. 4, lines 60-63

A7

1. A telephone network comprising a telephone switching centre coupled to a subscriber line, and an enhanced service processing apparatus (reads on IN)

the switching centre having event detection means for recording the occurrence of a predetermined event associated with the subscriber line, and call processing means responsive to an attempt to establish or terminate a call connection via the subscriber line to selectively either:

notify the enhanced service processing apparatus of that attempt, or: (col. 4-63-65, col. 6, lines 14-23 39-44)  
establish or terminate said call connection without such notification; (basically reads on full event #)

according to whether occurrence of the predetermined event has been recorded by the detection means, the enhanced service processing apparatus having means responsive to such notification to send switching control commands to the telephone switching centre. (see col. 4, lines)

2. A network according to claim 1, wherein the switching centre includes processing means including flag means, the processing means having means responsive to notification of said predetermined event to change the state of said flag means and, having means to determine, in dependence on the state of the flag means, whether to notify the enhanced service processing apparatus of an attempt to establish or terminate a call connection via said subscriber line. (may read on the trigger- col. 5, lines 9-20 col. 6 " 14-23)

3. A network according to claim 1 or 2, including event detecting means for detecting a predetermined event and notifying the switching centre of an occurrence of said event. (col. 6, lines 39-44)

4. A network according to claim 2, wherein the processing means includes a plurality of flag means associated with respective predetermined events, the processing means having means to change the state of the associated flag means in response to notification of one of said predetermined events and selection means controlled in dependence on the states of the flag means, together with the flag means state information, the selection means being arranged to select whether to notify the enhanced service processing apparatus of an attempt to establish or terminate a call connection via said subscriber line, and to perform such notification if so selected.

McConnell  
1-900 number  
claim 4, some  
as 1. above  
reads  
on the  
alarm trigger  
when the event  
is detected  
off dialling  
unauthorized  
or or ill  
event of busy  
or no answer.

5. A network according to claim 4, wherein the enhanced service processing apparatus has means to control the switching centre in dependence on said flag state information.

5

6. A network according to claim 3, 4 or 5, wherein the event detecting means comprises a voice mail system, the event or one of the events comprises storing of voice mail for the subscriber of said subscriber line.

10

7. A network according to any one of claims 3 to 6, wherein the event detecting means comprises a call charging system and the event or one of the events comprises the call charge for the subscriber of said subscriber line exceeding a threshold value.

15

8. A method of processing calls in a telephone network comprising:-  
recording the occurrences of one or more predetermined events at a telephone switching centre, said events being associated with a subscriber line connected to the switching centre;

20

detecting attempts to establish or terminate calls via the subscriber line;  
determining whether a record of the occurrence of one or more of said predetermined events exists at the switching centre; and

if it is determined that a record of the occurrence of one or more of said predetermined events exists at the switching centre:-

25

notifying an enhanced service processing apparatus of the attempt;  
generating switching control commands at the enhanced service processing apparatus; and  
communicating said commands to the switching centre to control the establishment or termination of said call; but

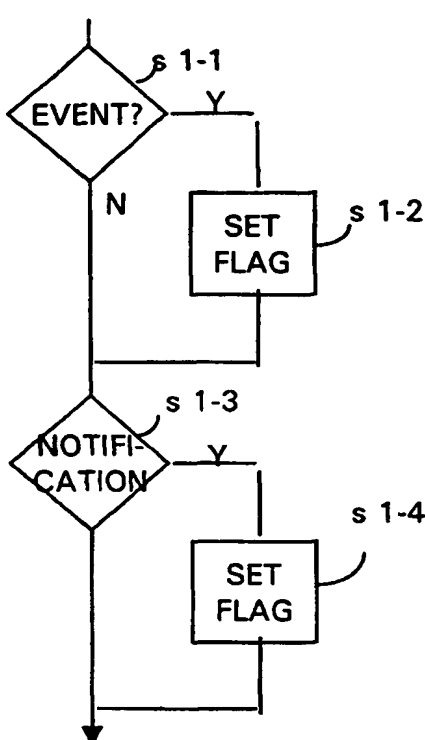
30

if it is determined that no record of the occurrence of one or more of said predetermined events currently exists at the switching centre:-  
establishing or terminating the call using only the switching functions of the switching centre.



**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>H04Q 3/00</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/10341</b> <b>(43) International Publication Date:</b> 24 February 2000 (24.02.00)
<b>(21) International Application Number:</b> PCT/GB99/02492 <b>(22) International Filing Date:</b> 30 July 1999 (30.07.99)  <b>(30) Priority Data:</b> 98306520.2 14 August 1998 (14.08.98) EP  <b>(71) Applicant (for all designated States except US):</b> BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY [GB/GB]; 81 Newgate Street, London EC1A 7AJ (GB).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> PETTIFOR, James, Douglas [GB/GB]; Cox Hill Cottage, Cox Hill, Boxford, Sudbury, Suffolk CO10 5HR (GB). CLAPTON, Alan, James [GB/GB]; 11 Winding Piece, Capel St Mary, Ipswich, Suffolk IP9 2UZ (GB).  <b>(74) Agent:</b> LIDBETTER, Timothy, Guy, Edwin; BT Group Legal Services, Intellectual Property Dept., 8th floor, Holborn Centre, 120 Holborn, London EC1N 2TE (GB).		<b>(81) Designated States:</b> AU, CA, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> INTELLIGENT NETWORK SERVICES  <b>(57) Abstract</b> <p>In a telephone network, a service control point (4) is called by a switching centre (2), if a flag has previously been set by some event, e.g. call charges crossing a threshold or the leaving of a voice mail message, when a call is being established or terminated. The switching centre (2) then operates in accordance with commands returned by the service control point (4). If no flags have been set the service control point (4) is not called, the call is treated by the switching centre (2) in a default manner.</p>  <pre>graph TD     EVENT{EVENT?} -- Y --&gt; SET_FLAG1[SET FLAG]     SET_FLAG1 --&gt; NOTIFICATION{NOTIFICATION}     NOTIFICATION -- Y --&gt; SET_FLAG2[SET FLAG]     SET_FLAG2 --&gt; EXIT[ ]     NOTIFICATION -- N --&gt; EXIT     EVENT -- N --&gt; NOTIFICATION</pre>		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
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BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
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CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
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### Intelligent Network Services

The present invention relates to a telephone network and a method of call processing in a telephone network.

- 5           In the present application, "enhanced service" means any service provided to a subscriber other than simple connection made, in response to dialling by a caller, between the terminal equipment from which the caller attempts to establish the call and another, "target", terminal equipment to which the attempt is made, and the associated signalling of ringing, engaged status and number unobtainable.
- 10   The enhanced service may be provided to either the subscriber making the call attempt (for example call barring) or to the subscriber at the target terminal equipment (for example voice mail).

It is known to provide such enhanced services, sometimes known as "intelligent network" services, in telephone networks. The processing required to

15   implement such services can be carried out by a telephone switching centre. However, this has been found to be undesirable because telephone switching equipment manufacturers must customise their switches according to different network operators' requirements. This increases the cost of such equipment.

An alternative approach is to use a relatively simple switching centre in

20   conjunction with an enhanced service processing apparatus, or "service control point". In this arrangement, the switching centre notifies the enhanced service processing apparatus of an attempt to establish a call connection and the enhanced service processing apparatus returns switching control commands such as "proceed as normal" or "bar call".

- 25           A third approach, exemplified in International Patent Specifications WO97/48238 and WO96/13949 also use an enhanced service processing apparatus, but this is invoked only if the switching centre identifies the call as being of a type which may require enhanced processing, either because the digits dialled identify a target party for which enhanced processing capability is required,
- 30   or because such capability has been previously specified for the calling party.

A disadvantage with these approaches is that there is often a lot of traffic between the switching centres and the enhanced service processing apparatus consisting of notifications of call connection establishment attempts and "proceed

as normal" commands, for example, if the conditions for call forwarding are not met (line not busy, wrong time of day, etc). This extra traffic, and the extra processing carried out by the enhanced service processing apparatus, can impede the efficient operation of the enhanced services processes. It is an aim of the present invention to solve or ameliorate the aforementioned problem.

According to the present invention, there is provided a telephone network comprising a telephone switching centre coupled to a subscriber line and being responsive to an attempt to establish or terminate a call connection via the subscriber line to selectively either

10            notify an enhanced service processing apparatus of that attempt, or establish or terminate said call connection without such notification; said selection being based on the previous occurrence of a predetermined event associated with the subscriber line, the enhanced service processing apparatus being responsive to such notification to send switching control commands to the

15    telephone switching centre. As a consequence, traffic between the switching centre and the enhanced services processing apparatus only occurs when there is at least the possibility of a switching control command other than "proceed as normal".

Preferably, the switching centre includes processing means including flag

20    means, the processing means being responsive to notification of said predetermined event to change the state of said flag means and, in the event of an attempt to establish or terminate a call connection via said subscriber line, to determine, in dependence on the state of the flag means, whether to notify the enhanced service processing apparatus of the attempt. The switching centre

25    therefore merely requires a flag to be set for each subscriber line to indicate whether the switch should currently invoke the enhanced services processing apparatus. The flags are controlled by the service processing apparatus, in response to requests from the user, or other events. The switch itself carries out no processing of the enhanced service, other than to determine from the flag

30    setting whether the enhanced services processing apparatus is required.

Preferably, event-detecting means is included for detecting a predetermined event and notifying the switching centre of an occurrence of said event.

Preferably, the processing means includes a plurality of flag means associated with respective predetermined events, the processing means being responsive to notification of one of said predetermined events to change the state of the associated flag means and, in the event of an attempt to establish or  
5 terminate a call connection via said subscriber line to select, in dependence on the states of the flag means together with the flag means state information, whether to notify the enhanced service processing apparatus of the attempt, and to perform such notification if so selected. More preferably, the enhanced service processing apparatus generates said switching control commands in dependence  
10 on said flag state information.

The event detecting means may comprise a voice mail system, in which case the event or one of the events comprises storing of voice mail for the subscriber of said subscriber line. The event detecting means may comprise a call charging system, in which case the event or one of the events comprises the  
15 accumulated call charges for the subscriber of said subscriber line exceeding a threshold value.

According to the present invention, there is also provided a method of processing calls in a telephone network comprising:-

recording the occurrences of one or more predetermined events at a  
20 telephone switching centre, said events being associated with a subscriber line connected to the switching centre;

detecting attempts to establish or terminate calls via the subscriber line;

determining whether a record of the occurrence of one or more of said predetermined events exists at the switching centre; and

25

if it is determined that a record of the occurrence of one or more of said predetermined events exists at the switching centre:-

notifying an enhanced service processing apparatus of the attempt;

generating switching control commands at the enhanced service  
30 processing apparatus; and

communicating said commands to the switching centre to control the establishment or termination of said call; but

if it is determined that no record of the occurrence of one or more of said predetermined events currently exists at the switching centre:-

establishing or terminating the call using only the switching functions of the switching centre.

- 5           The event may comprise, for example, storing of voice mail, or exceeding of a threshold value by a cumulative parameter relating to usage of the telephone system, such as call charges accumulated on the user's account. Other events, such as accessing the voice mail or replenishing the funds in a user account, may cause such records to be erased, such that the enhanced service processing
- 10           apparatus is not then notified of further call attempts until a further occurrence of the predetermined event.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 illustrates part of a telephone system;

- 15           Figure 2 illustrates switching centre of the telephone system of Figure 1; and
- Figures 3, 4 and 5 are flow diagrams illustrating the operation of the system of Figure 1.

- Referring to Figure 1, a telephone system comprises a terminal equipment 1, for instance a telephone set, connected by a telephone line to a switching
- 20           centre 2. The switching centre is connected to the rest of the Public Switched Telephone Network 3 and also to a service control point 4. The service control point 4 provides instructions to the switching centre 2 for the provision of enhanced services.

- Referring to Figure 2, the switching centre comprises a digital switching
- 25           matrix 5, a plurality of subscriber line cards 6 connected to the switching matrix 5, a plurality of trunk interfaces 7 also connected to the switching matrix 5, a control processor 8 and a plurality of signalling interfaces 9, some of which are coupled to subscriber lines and some of which are connected to trunks. The control processor 8 controls the operation of the digital switching matrix 5 in response to
- 30           signalling data from the signalling interfaces 9 and switching control commands from the service control point 4. The control processor 8 also receives data from and sends data to a call charging subsystem 10.

The operation of the exemplary embodiment of Figures 1 and 2 will now be described with reference to Figures 3, 4 and 5.

It is known for a calling party to be offered the opportunity of leaving a voice mail message in the event that the called party does not answer the call.

- 5 This known process differs in a system according to the present invention in that an "end of call-voice mail" flag, or trigger, is set in the control processor 8 when voice mail is left.

When the called party subsequently makes a call and that call terminates, the control processor 8 notes that the "end of call-voice mail" flag is set and calls  
10 the service control point 4, sending the identity of the flag and the identity of the subscriber. The service control point 4 responds by returning switching control commands to the control processor 8 of switching centre 2 to cause it to connect the subscriber to a voice mail centre so that he can listen to his voice mail.

Another function provided by the present embodiment is call barring in the  
15 event of call charges reaching a limit value. In order to provide this function, the control processor 8 implements an "start of call - excess charge" flag. Normally, this flag is set to false. Accordingly, when the subscriber makes a call, the call is routed by the switch centre 2 without reference to the service control point 4. However, if the cost of the subscriber's calls exceed a threshold value, the call  
20 charging sub-system 10 notifies the switching centre 2 which then sets the "start of call - excess charge" flag. Consequently, when the subscriber now attempts to make a call, the control processor 8 detects that the call is being made and that the "start of call - excess charge" flag is set, and notifies the service control point 4. The service control point 4 then returns call barring commands to the control  
25 processor 8 of the switching centre 2. The control processor 8 responds by controlling to switching matrix 5 so as to bar the subscriber's call.

Referring to Figures 3, 4 and 5, it will be appreciated that the operation of a system according to the present invention may be generalised as follows.

A first process of the control processor 8, shown in Figure 3, monitors the  
30 signalling interfaces 9 for predetermined events (step s1-1) and, if one of the predetermined events is detected, it causes a flag setting to be changed (step s1-2). In the same process, the control processor 8 checks for incoming notification signals from other system control and administration components, e.g. a call

charging sub-system, (step s1-3) and, if such signals are received, sets corresponding flags (step s1-4).

A second process of the control processor 8, shown in Figure 4, comprises determining that a party is attempting to set up call (step s2-1) and  
5 determining whether any relevant flags, i.e. flags associated with one or other of the would-be parties to the call, are set (step s2-2). If a flag is set, the control processor 8 communicates this information to the service control point 4 (step s2-3) together with the identity of the party to which the flag relates. The control processor 8 then receives switching control commands back from the service  
10 control point 4 (step s2-4) and implements them (step s2-5). If no flags are set, the call is routed without reference to the service control point 4.

A third process of the control processor 8, shown in Figure 5, comprises determining that a call is being terminated (step s3-1) and determining whether any relevant flags, i.e. flags associated with one or other of the parties to the call,  
15 are set (step s3-2). If a flag is set, the control processor 8 communicates this information to the service control point 4 (step s3-3) together with the identity of the party to which the flag relates. The control processor 8 then receives switching control commands back from the service control point 4 (step s3-4) and implements them (step s3-5). If no flags are set, the call terminates in the normal  
20 manner with no reference being made to the service control point 4.

It will be appreciated that flags associated with many different events may be implemented and that the present invention is not limited to the illustrative examples described above.



Claims

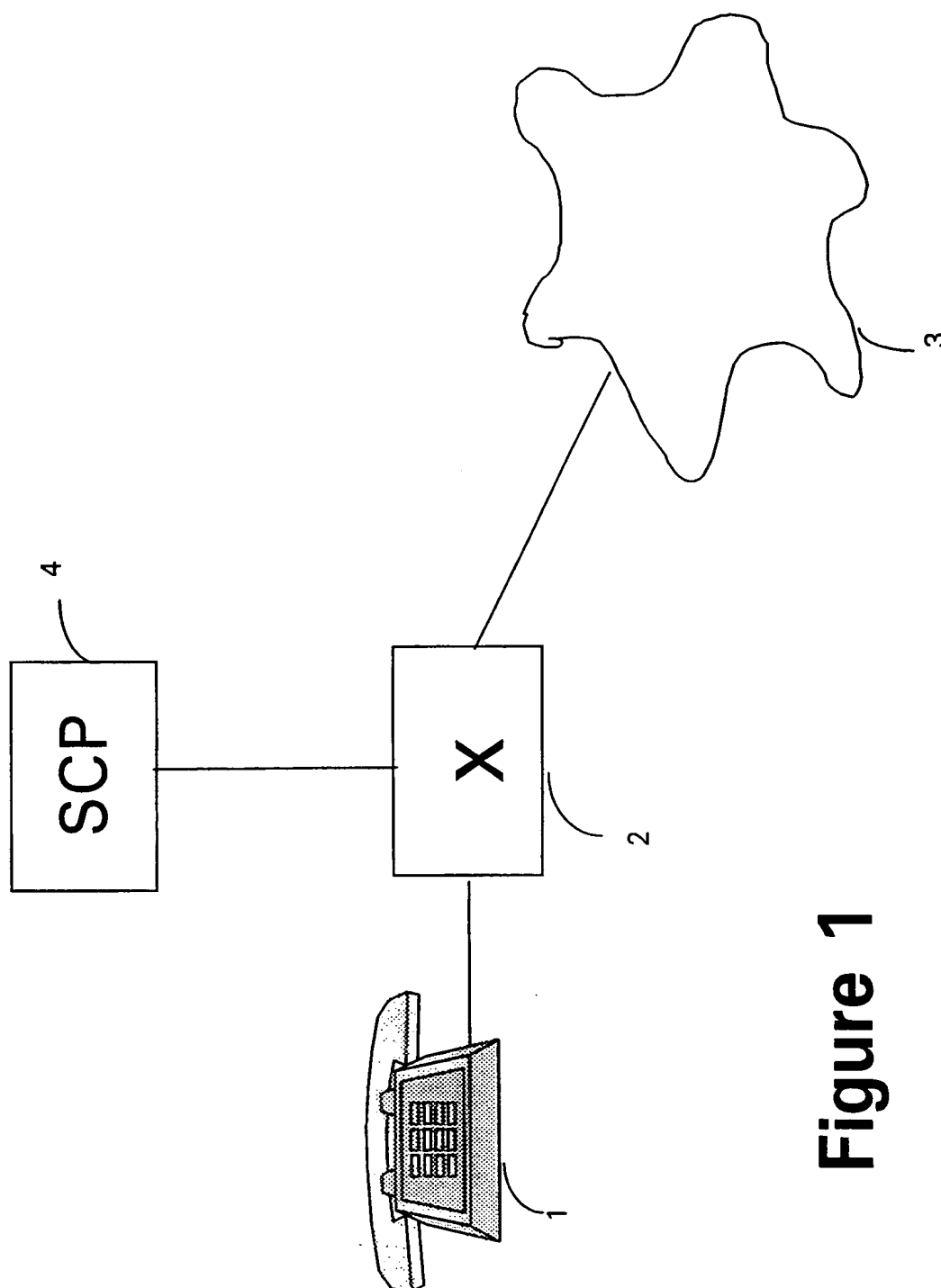
1. A telephone network comprising a telephone switching centre coupled to a subscriber line and being responsive to an attempt to establish or terminate a call connection via the subscriber line to selectively either:
  - 5 notify an enhanced service processing apparatus of that attempt,
  - or
  - establish or terminate said call connection without such notification;said selection being based on the previous occurrence of a predetermined event associated with the subscriber line, the enhanced service processing apparatus  
10 being responsive to such notification to send switching control commands to the telephone switching centre.
2. A network according to claim 1, wherein the switching centre includes  
15 processing means including flag means, the processing means being responsive to notification of said predetermined event to change the state of said flag means and, in the event of an attempt to establish or terminate a call connection via said subscriber line, to determine, in dependence on the state of the flag means, whether to notify the enhanced service processing apparatus of the attempt.  
20
3. A network according to claim 1 or 2, including event detecting means for detecting a predetermined event and notifying the switching centre of an occurrence of said event.
- 25 4. A network according to claim 2, wherein the processing means includes a plurality of flag means associated with respective predetermined events, the processing means being responsive to notification of one of said predetermined events to change the state of the associated flag means and, in the event of an attempt to establish or terminate a call connection via said subscriber line to  
30 select, in dependence on the states of the flag means together with the flag means state information, whether to notify the enhanced service processing apparatus of the attempt, and to perform such notification if so selected.

5. A network according to claim 4, wherein the enhanced service processing apparatus generates said switching control commands in dependence on said flag state information.
- 5 6. A network according to claim 3, 4 or 5, wherein the event detecting means comprises a voice mail system, the event or one of the events comprises storing of voice mail for the subscriber of said subscriber line.
7. A network according to any one of claims 3 to 6, wherein the event  
10 detecting means comprises a call charging system and the event or one of the events comprises the call charge for the subscriber of said subscriber line exceeding a threshold value.
- 8 A method of processing calls in a telephone network comprising:-  
15 recording the occurrences of one or more predetermined events at a telephone switching centre, said events being associated with a subscriber line connected to the switching centre;  
detecting attempts to establish or terminate calls via the subscriber line;  
determining whether a record of the occurrence of one or more of said  
20 predetermined events exists at the switching centre; and
- if it is determined that a record of the occurrence of one or more of said predetermined events exists at the switching centre:-  
notifying an enhanced service processing apparatus of the attempt;  
25 generating switching control commands at the enhanced service processing apparatus; and  
communicating said commands to the switching centre to control the establishment or termination of said call; but
- 30 if it is determined that no record of the occurrence of one or more of said predetermined events currently exists at the switching centre:-  
establishing or terminating the call using only the switching functions of the switching centre.

9. A method according to claim 8, wherein said event comprises storing of voice mail.

5 10. A method according to claim 8, wherein said event comprises the exceeding of a threshold value by a cumulative parameter relating to usage of the telephone system.

11. A method according to any of claims 8, 9 or 10, wherein the recording of  
10 the occurrence of one or more of the said events takes the form of erasure or cancellation of the recording of another of the said events having occurred previously, such that the enhanced service processing apparatus is not then notified of further call attempts until a further occurrence of the said previously-occurring event.

**Figure 1**

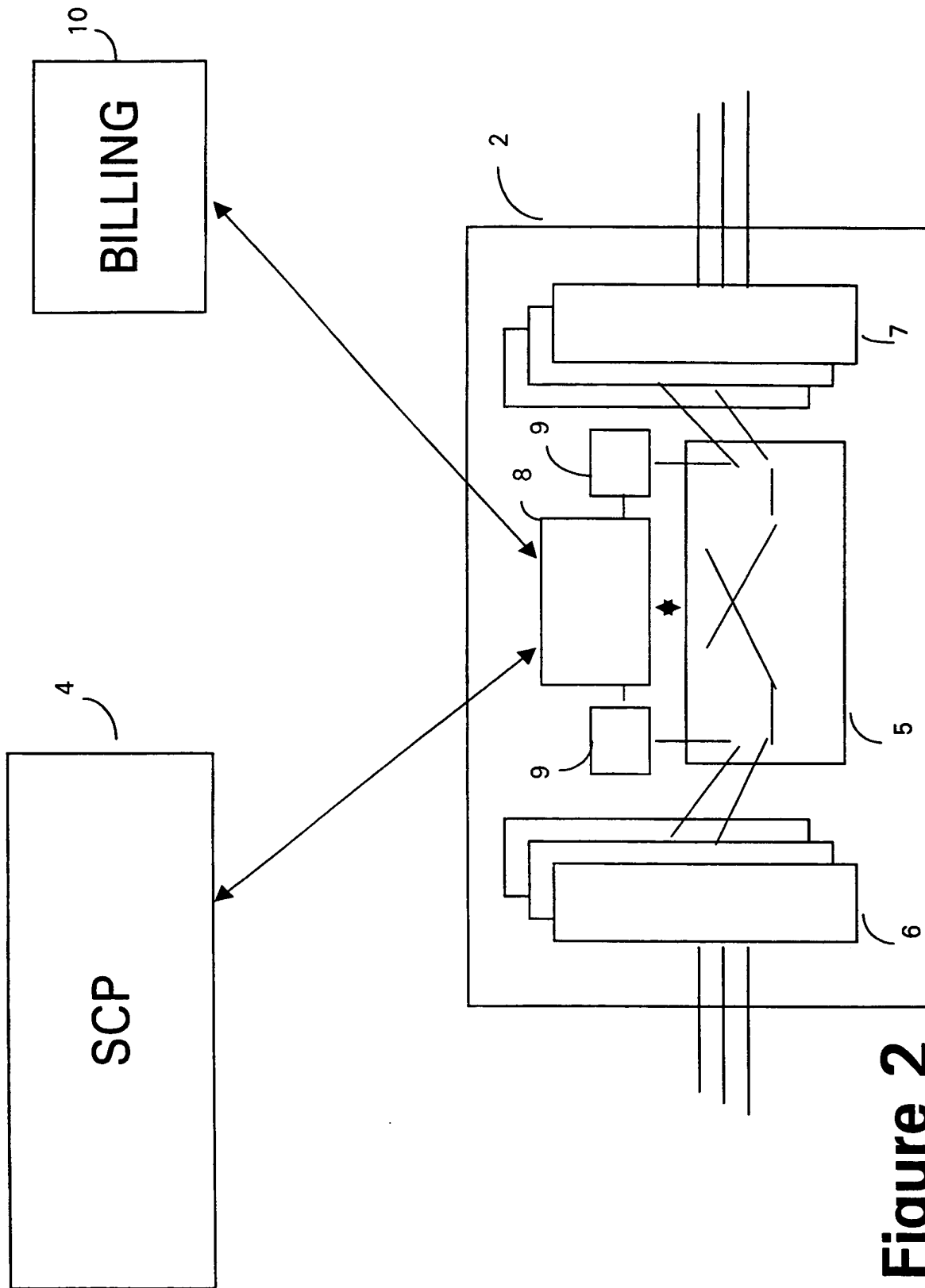
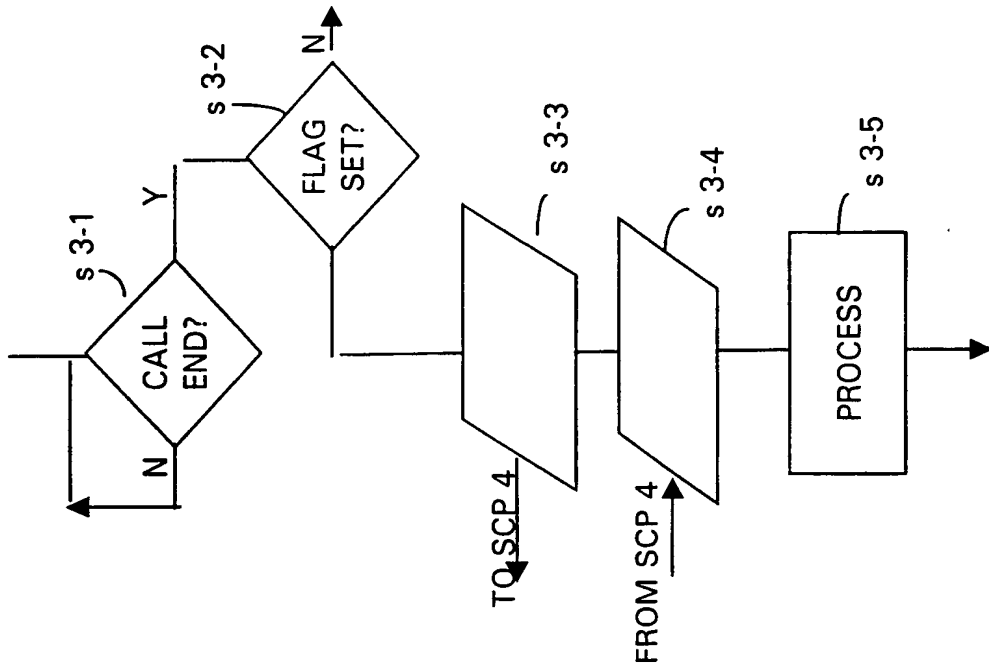
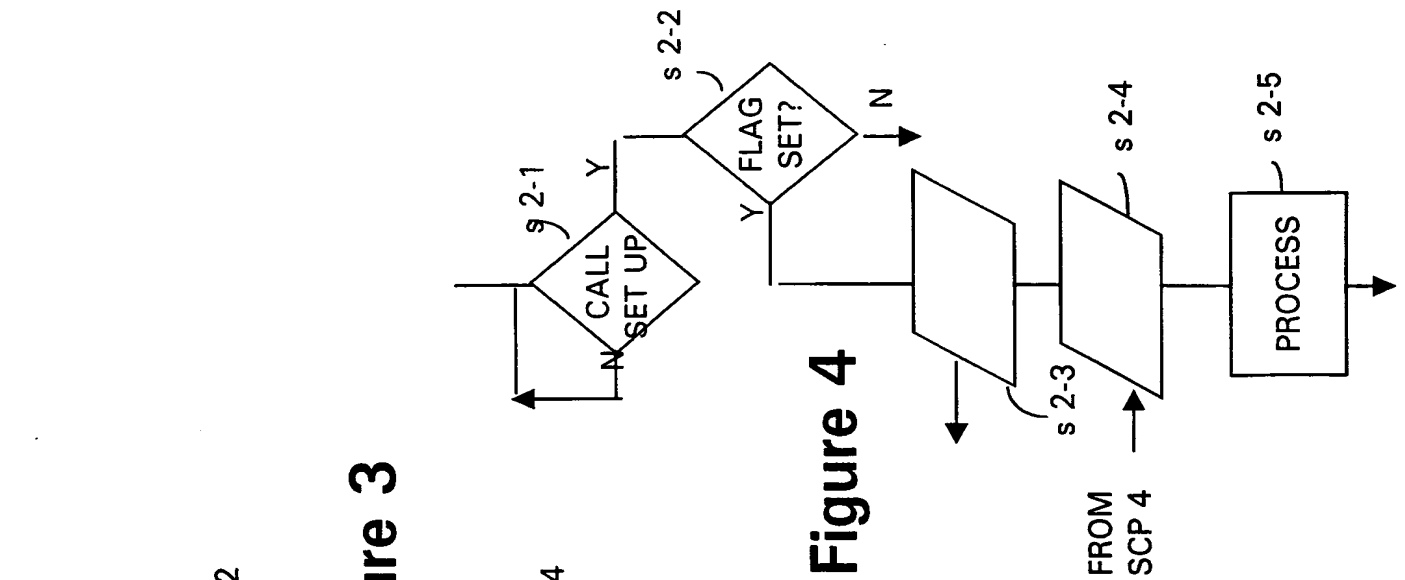


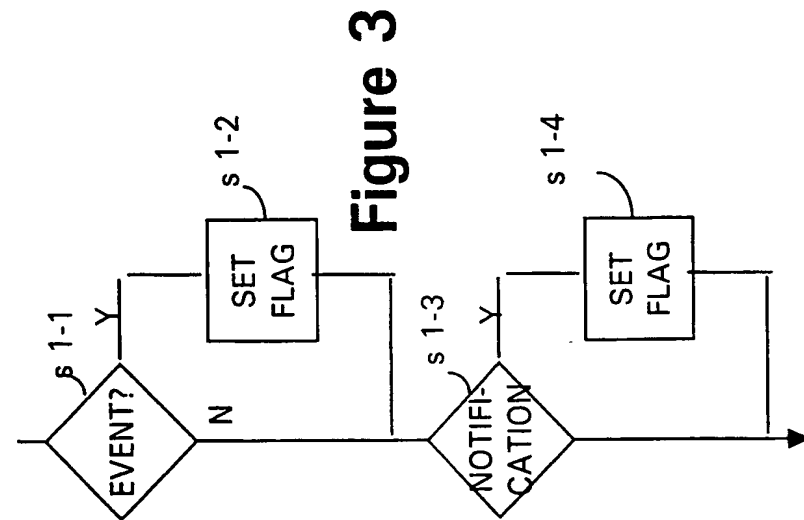
Figure 2



**Figure 5**



**Figure 4**



**Figure 3**

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 99/02492

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04Q3/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	EBERT I ET AL: "APPLICATION OF A SERVICE-INDEPENDENT ARCHITECTURE" INNOVATIONS IN SWITCHING TECHNOLOGY, STOCKHOLM, MAY 28 - JUNE 1, 1990, vol. 6, no. SYMP. 13, 28 May 1990 (1990-05-28), pages 57-62, XP000130898 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS page 59, column 2, line 25 - line 38 figure 5 --- -/--	1-5,8

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone  
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.  
"&" document member of the same patent family

Date of the actual completion of the international search

2 November 1999

Date of mailing of the international search report

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 99/02492

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
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